

REMARKS

In the September 10th Office Action, the Examiner indicated that:

- (1) Claims 82-86 and 91-95 are allowed;
- (2) Claims 3, 5-17, 20-28, 31, 34, 36-48, 51-59, 61, 62, 72, 75, and 78-81 would be allowable if written in independent form; and
- (3) Claims 1, 2, 4, 18, 19, 29, 30, 32, 33, 35, 49, 50, 60, 63-71, 73, 74, 76, 77, and 87-90 are allegedly anticipated by various references (see below).

By the above amendments, applicants have written in independent form the following claims which the Examiner indicated would be allowable if so written: Claims 3, 7, 8, 14, 22, 31, 34, 38, 39, 45, 53, 61, 62, 72, 75, and 78.

As to the rejected claims, applicants comments concerning these claims are as follows.

I. Claims 1-2, 4, 18-19, 29-30, 32-33, 35, 49-50, and 60

In the Office Action, the Examiner rejected Claims 1-2, 4, 18-19, 29-30, 32-33, 35, 49-50, and 60 under 35 USC §102(e) as allegedly anticipated by Chao et al., U.S. Patent No. 6,285,503 (Chao).

By the above amendments, independent Claims 1 and 32 have been amended to require that at least some of the microstructures comprise "a curved microlens portion or a triangular portion or a pyramidal portion." Support for the use of microstructures having a curved microlens portion can be found throughout applicants' specification. Support for a triangular portion can be found at, for example, page 26, lines 16-25, and page 31, lines 19-25, while support for a pyramidal portion can be found at page 6, line 11.

Chao uses only flat structures and thus does not disclose or suggest the use of microstructures having curved, triangular, or pyramidal portions.

In addition to amending Claim 1 and 32, applicants have also written Claims 4 and 35 in independent form and have amended these claims to make explicit that the mosaic called for by the claims is not a regular array. Support for the amendments to these claims can be found in, for example, applicants' Figures 39 and 49 which show mosaics at least a portion of each of which is not a regular array. See also page 35, line 30, to page 36, line 4, of applicants' specification.

Chao's microstructures are plainly regularly arranged. Accordingly, applicants respectfully submit that Chao does not disclose or suggest a mosaic having at least a portion which is not a regular array, as called for by Claims 4 and 35.

II. Claims 63-65

Claims 63-65 were rejected under 35 USC §102(b) as allegedly anticipated by Popovic et al., U.S. Patent No. 4,689,291 (Popovic et al.).

By the above amendments, independent Claim 63 has been amended to call for a close-packed array of microstructures. Popovic et al. disclose a process for producing microlenses which comprises melting a photoresist resin. Popovic et al. use "sharp edge pedestals" to "confine the lateral flow of [the] molten lens material." (Popovic et al., abstract, lines 1-4.) As such, Popovic et al. cannot close pack their microlenses since if they did, the lateral flow of the molten lens material would not be confined. Accordingly, applicants respectfully submit that the Popovic et al. patent does not disclose or suggest Claim 63 or its dependent Claim 64.

In addition to amending Claim 63, applicants have also written Claim 65 in independent form. This claim requires that the microstructure have a curved microlens portion that has "a parabolic shape." As discussed above, the Popovic et al. system relies on melting a lens material. Put simply, melting does not produce a parabolic shape. Accordingly, as with Claims 63-64, applicants submit that Popovic et al. do not disclose or suggest the subject matter of Claim 65.

III. Claims 66-67

Claims 66-67 were rejected under 35 USC §102(b) as allegedly anticipated by JP 5-053174 (JP '174).

By the above amendment, independent Claim 66 has been amended to require a non-zero value for the κ parameter. As illustrated in, for example, applicants' Figure 2 and the combination of Figures 26 and 28, the κ parameter is a major parameter for controlling the shape of a scatter pattern. JP '174 does not disclose or suggest this feature of applicants' invention as evidenced by the basic fact that none of the equations which appear in this reference include this parameter. Accordingly, applicants respectfully submit that JP '174 does not disclose or suggest the subject matter of independent Claim 66 and its dependent Claim 67.

IV. Claims 68-69

Claims 68-69 were rejected under 35 USC §102(b) as allegedly anticipated by Johnson et al., U.S. Patent No. 5,442,482 (Johnson et al.).

By the above amendment, each of independent Claims 68 and 69 has been amended to specify that " c_x and c_y are predetermined, non-equal, non-

zero, curvatures along x and y, respectively" (newly added language underlined).

At column 1, lines 53-58, Johnson et al. describe their microlenses as follows:

According to one aspect of the present invention, the individual microlenses in the array are elongated in one direction in the plane of the screen, so that a middle region of each microlens acts as a cylindrical lens whilst the end regions thereof act as respective parts of respective spherical lenses.

Thus, Johnson et al.'s microlenses are composed of a cylindrical center section and spherical end sections. When described by equations of the type set forth in Claims 68 and 69, a cylinder has one non-zero curvature and one curvature which is zero, while a sphere has two equal curvatures. Accordingly, neither Johnson et al.'s center section nor their end sections have "non-equal, non-zero, curvatures along x and y, respectively." Applicants thus respectfully submit that Johnson et al. does not anticipate or render obvious Claims 68 and 69.

V. Claims 70-71, 73-74, and 76

Claims 70-71, 73-74, and 76 were rejected under 35 USC §102(b) as allegedly anticipated by Umeda et al., U.S. Patent No. 5,119,235 (Umeda et al.).

As set forth above, Claim 70 has been amended to require that the plurality of microstructures forms "an array having a total array depth range of at least 10 microns." Support for this amendment can be found in, for example, applicants' Screen Design Tables (see pages 40-45 of the specification) where in all cases the total array depth range is at least 10 microns.

In direct contrast to this 10 micron lower limit, Umeda et al. specifically teach forming a microscopic surface roughness by "keeping the average difference between vertex and bottom not larger than 5 μm ." (Umeda et al., column 11, lines 61-64). Furthermore, in column 4, Umeda et al. define their variation range Δh as $\Delta h = H \cdot P$, and limit H to be less than or equal to 0.1 and P to be less than or equal to 30 μm (see also Umeda et al.'s Claim 1). Given these upper bounds on H and P, Δh can be no larger than 3 μm . Plainly, under these circumstances, Umeda et al. cannot be said to disclose or suggest a total array depth range of at least 10 microns, as required by Claim 70.

In addition to the foregoing amendment to Claim 70, applicants have also added Claim 96 to the application which like allowable Claim 72 specifies that each microstructure comprises a curved, microlens portion and a straight-sided, piston portion, but instead of specifying that the piston portion is randomized as in Claim 72, specifies that the microlens portion is randomized. Support for this claim can be found at, for example, page 11, line 17, to page 12, line 2, of the specification. Applicants respectfully submit that Umeda et al. does not disclose or suggest microstructures of the type called for by Claim 96.

VI. Claim 77

Claim 77 was rejected under 35 USC §102(b) as allegedly anticipated by Bradley, Jr. et al., U.S. Patent No. 4,767,186 (Bradley, Jr. et al.).

By the above amendment, Claim 77 requires that at least some of the microstructures have a piston portion with a non-zero height. Put simply, Bradley, Jr. et al. does not disclose or suggest such a structure.

VII. Claims 87 and 88

Claims 87 and 88 were rejected under 35 USC §102(b) as allegedly anticipated by EP 0 311 189 (EP '189).

By the above amendment, Claim 87 has been amended to specify that the microlens referred to in that claim is a "non-cylindrical" microlens. Support for this amendment can be found throughout applicants' specification (see, for example, applicants' Screen Design Tables at page 43-45, of the specification).

Column 5, lines 35-38, of EP '189 describe a structure having "a multiple of cylindrical lenses arranged on Fresnel facets of the first Fresnel structure and extending in the same direction as said Fresnel facets" (emphasis added; see also Figures 3 and 4 of EP '189). No where in the reference is there any disclosure or suggestion of non-cylindrical lenses. Accordingly, applicants respectfully submit that EP '189 does not disclose or suggest Claim 87.

Claim 88 calls for "a Fresnel lens which comprises a plurality of surfaces in the form of concentric rings" and "a plurality of microstructures distributed over at least some of said plurality of surfaces" (emphasis added). EP '189, on the other hand, only discloses "linear Fresnel structures" (see, for example, lines 3-4 of the abstract of EP '189). Accordingly, as with Claim 87, applicants believe that Claim 88 is properly patentable in view of EP '189.

VIII. Claims 89 and 90

Claims 89 and 90 were rejected under 35 USC §102(b) as allegedly anticipated by JP 54-083846 (JP '846).

As set forth above, independent Claim 89 has been amended to specify that the "perimeters of the unit cells are non-regular polygons distributed so as to form a Voronoi tessellation" (newly added language underlined). Support for this amendment can be found at page 16, lines 11-15, of applicants' specification and in Figure 20.

As illustrated in Figure 20, Voronoi tessellations do not have reentrant edges. Figure 14 of JP '846, on the other hand, shows numerous reentrant edges and thus does not disclose or suggest a Voronoi tessellation. Accordingly, applicants respectfully submit that Claim 89 and its dependent Claim 90 fully distinguish JP '846.

IX. Conclusion

In view of the foregoing, applicants believe that the present application is now in condition for allowance. Accordingly, reconsideration and the issuance of a notice of allowance for the application are respectfully requested.

Respectfully submitted,

Date: 2/9/04

Maurice M. Klee
Maurice M. Klee, Ph.D.
Reg. No. 30,399
Attorney for Applicant
1951 Burr Street
Fairfield, CT 06824
(203) 255-1400